- R E M A R K S –

Specification

The abstract is objected to because it is not on a separate sheet. A separate abstract is provided on a separate sheet in the appendix included herein.

Claim Rejections – 35 USC §112

Claim 50 is rejected under 35 USC 112(1) for allegedly being based on a disclosure that is not enabling. The Applicant respectfully traverses this rejection on the following basis.

The Examiner alleges that the steps of how to apply a heating cycle to trim resistance value away from a target resistance value and back to the target resistance value are not enabled by the disclosure. The following passage is found at page 9, lines 2-8 of the specification as originally filed:

> "A heating cycle should be understood as a sequence of pulses used to trim a parameter in a first direction and a sequence of pulses to trim the parameter in an opposite direction, i.e. away from a starting point and back towards the starting point. There are at least two pulses in a heating cycle, each pulse being of the same or different amplitude, and each pulse being of the same or different duration."

Therefore, it should be understood by a person skilled in the art that the way to apply a heating cycle is to apply a sequence of pulses, and that the result will be that the resistance value of the component will be changed. The parameters of the heating pulses will affect the trimming process, as is stated at page 9, lines 25-29 as follows:

> "The thermal cycling associated with the adjustment of resistance (either up or down) requires a series of heating pulses having sensitively different

amplitudes. The tendency is that higher heating pulses result in trimming down. Pulses with lower amplitude result in resistance recovery or trimming down, depending on the recent thermal history".

The Applicant therefore submits that the step of how to apply a heating cycle is fully enabled by the disclosure.

The Examiner further alleges that the step of how to modify the temperature coefficient of resistance after applying the heating cycle by cycling the resistance value away from and back towards a starting point is not enabled. Figure 1 describes the dependence of TCR (temperature coefficient of resistance) on thermal trimming of resistance according to the prior art. From this, it should be understood that the TCR changes when one trims the resistance. Page 9, line 30 to page 10, line 13 states the following:

> "It was experimentally found that a TCR-change cycle containing first at least one heating pulse having rather high amplitude (to cause trimming down) and then a plurality of recovery pulses having lower (not necessarily constant) amplitude, results in a decrease of TCR. Fastest recovery is obtained by applying a sequence of pulses where each pulse is equal to or lower than the previous. If the next analogous TCR-change cycle contains another "first" heating pulse having higher amplitude than the previous one, the TCR will again decrease.
>
> It was also experimentally found that, if, within a TCR-change cycle, the "first" heating pulse or pulses (which may give either a moderate decrease or increase in resistance), has amplitude substantially lower than the amplitude of the "first" pulse(s) in a recent TCR-change cycle which decreased TCR, then the TCR can be increased instead of decreased (Note that the determination of whether TCR was increased or decreased must be done after the resistance is restored to R_{target})."

It therefore follows that it is the action of cycling the resistance value away from its original value and back towards its original value that will modify the TCR, while maintaining the original value of resistance.

The Applicant therefore submits that claim 50 is fully supported by the disclosure, which is believed to be enabling and to meet the requirements of 35 USC 112(1).

Claim 50 is rejected under 35 USC 112(2) as being indefinite. In particular, the Examiner alleges that the step of applying a heating cycle to trim a resistance value away from a target resistance value and back to the target resistance value is unclear and vague and that the metes and bounds cannot be determined. As indicated above with respect to the 112(1) rejection, the Applicant respectfully submits that proper support and disclosure is fully provided in the specification as originally filed, such as in the passages cited above. The figures and description fully explain how to apply a heating cycle to modify the resistance value of a component such that it be cycled away from and back to its original value.

The Examiner further inquires about the relationship between temperature coefficient of resistance (TCR) and resistance of a component. The Applicant respectfully submits that a person skilled in the art will understand that these two parameters are intimately linked in that TCR is a number used to predict how the resistance of a material changes with changes in temperature, and that as figure 1 indicates, there is a dependence of TCR on thermal trimming of resistance. Therefore, the steps of claim 50 indicate, in a clear and concise manner, how to trim the TCR of a component “while maintaining a substantially constant resistance value”.

The Applicant therefore submits that claim 50 meets the requirements of 35 USC 112(2).

Claim Rejections – 35 USC §101

Claim 50 is rejected under 35 USC 101 for allegedly having a claimed recitation of use without setting forth any steps involved in the process. In particular, the Examiner alleges that the claim provides for the use of a hysteresis

characteristic of the thermally mutable material but does not set forth any steps involved in the method/process.

The Applicant respectfully submits that the step of "applying a heating cycle to trim said resistance value away from a target resistance value and back to said target resistance value" uses the hysteresis characteristic of the thermally mutable material to modify the TCR. In fact, it is the hysteresis characteristic of the thermally mutable material that allows the TCR to be modified while cycling the resistance value away from and back to its original value. This concept is fully explained in the specification as originally filed and is understood by a person of skill in the art.

The Applicant therefore traverses this rejection and asks that it be withdrawn.

Claims 50-63 are rejected under 35 USC §101 for being directed to non-statutory subject matter. In particular, the claims are rejected for failing to meet the machine or transformation test. The Applicant respectfully submits that a transformation of the thermally mutable material occurs during the process set out by the method claim in that the temperature coefficient of resistance is modified from an original value to a new value. In addition, the process of thermal trimming, which consists in applying a heat pulse to a component, necessarily involves a transformation of the thermally mutable material in that the make-up of the material is modified by the heat being applied thereto.

The Applicant therefore traverses this rejection and asks that it be withdrawn.

Claim 50 is rejected under 35 USC §101 for lacking patentable utility. The Applicant respectfully submits that the trimming (adjustment) of resistors is a widely used procedure in the manufacture of microelectronics and electronic components, and in common design of user circuits, especially where precision calibration is desired. In principle, one trims the resistor until an observable local or

global circuit parameter reaches a desired value. Resistor trimming is widespread in both manufacturing of a variety of components and instruments, and in the user community. The design of any high-precision analog electrical circuit must entail careful consideration of temperature variation, and therefore, modifying the TCR of a component is of high importance and of patentable utility. The tangible result produced with the claimed method is a component having a substantially maintained resistance value, with a modified TCR value.

The Applicant requests that this rejection be withdrawn.

Claim Rejections - §102

Claims 50-55 and 59-63 are rejected under 35 USC 102(e) as being anticipated by Nelson et al. (US 2003/0101573). This rejection is respectfully traversed.

Nelson describes a method for manufacturing a planar temperature sensor including disposing a thick amount of material and laser trimming to ablate material in order to achieve a desired resistance value. Laser trimming involves the removal or ablation of a part of the material of the component, and differs from thermal trimming, which is known as the application of a heat pulse to change the make-up of the material by breaking and reforming bonds within the material and/or redistributing dopants within the material. When thermally trimming a component, no material is physically removed from the component. Laser trimming using ablation permanently removes significant masses of the resistor material, while thermal trimming does not.

Therefore, Nelson differs from the claimed subject matter significantly. In addition, there is no mention of the component being made from a thermally mutable material, which is not necessary when trimming by ablation. Moreover, Nelson does not state that the material used possesses

a hysteresis characteristic, and therefore cannot achieve the result of claim 50 when performing the recited method.

Nelson describes a method to trim a resistance value of a component, not a method to modify the TCR while maintaining a resistance value of a component.

The Applicant respectfully requests that the rejection be withdrawn.

Conclusion

In view of the above, the Applicant believes the application is in condition for allowance and a notice to that effect is earnestly solicited.

Respectfully submitted,
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